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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/752,656	12/29/2000	Beth C. Munoz	00140	9394

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EXAMINER

SINES, BRIAN J

ART UNIT

PAPER NUMBER

1743

DATE MAILED: 01/17/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/752,656

Applicant(s)

MUNOZ ET AL.

Examiner

Brian J. Sines

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-40 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 5, 7 – 26 and 28 – 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Lewis et al. (U.S. Pat. No. 5,571,401 A). Regarding claims 1 and 22, Lewis et al. teach a sensor comprising a layer comprising conductive modified particles, wherein the sensor is electrically connected to an electrical measuring apparatus (col. 3, line 36 – col. 8, line 17). Lewis et al. teach the incorporation of various organic conducting polymers (col. 4, lines 18 – 34). Regarding claims 2 and 22 – 24, Lewis et al. teach that the device may comprise an array of sensors, wherein a single sensor may comprise regions of conducting and nonconducting materials (col. 1, line 65 – col. 2, line 39; col. 3, lines 40 – 48). Regarding claims 3, 24 and 31, Lewis et al. teach that the conductive modified particles may comprise carbon products having attached at least one organic group (col. 4, lines 7 – 65). Regarding claims 4, 5, 11, 25, 26 and 32, Lewis et al. teach the use of carbon black, a black pigment, having attached at least one organic group (col. 4, lines 17 – 34). Regarding claims 7 and 28, Lewis et al. teach an aggregate or mixture comprising a carbon phase, such as various carbonaceous materials, and a silicon-containing phase, such as highly-doped semiconductors including silicon (col. 4, lines 7 – 64). Regarding claims 8 and 29,

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Lewis et al. teach the incorporation of a metal-containing phase, such as a gold-copper alloy, highly-doped semiconductors, conductive metal oxides and superconductors (col. 4, lines 19 – 34). Regarding claims 9, 10, 12, 13, 30, 33, 34 and 37, Lewis et al. anticipate the incorporation of a partially coated carbon black material having attached at least one organic group, such as an organic conducting polymer (col. 3, line 34 – col. 4, lines 65). Regarding claims 14 – 16, 35 and 36, Lewis et al. teach the use of organic polymers containing ionizable groups (col. 4, lines 7 – 65). Regarding claim 17, Lewis et al. teach that each sensor in a sensor array provides a different response for the same analyte with a detector that is operatively associated with each sensor (col. 1, line 65 – col. 2, line 39; col. 7, lines 23 – 58). Regarding claim 18, Lewis et al. teach that the sensor arrays comprise a plurality of compositionally different chemical sensors (col. 3, line 40 – col. 4, line 65). Regarding claims 19, 20 and 38, Lewis et al. teach a method for detecting the presence of an analyte in a fluid using a sensor array (col. 3, line 40 – col. 4, line 6; col. 7, line 23 – col. 8, line 19). Regarding claim 21, Lewis et al. teach that the method may further comprise a means to compare the response with a library of responses to match the response in order to determine the presence or the concentration of the analyte (col. 7, lines 14 – 18). Regarding claim 39, Lewis et al. teach that the detector may be optimized to detect resistance (col. 2, lines 1 – 39). Regarding claim 40, Lewis et al. teach that the method may incorporate a second sensor, wherein the sensor comprises regions of conducting and nonconducting materials (col. 1, line 65 – col. 2, line 39; col. 3, lines 40 – 48).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 6 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewis et al. in view of Li et al. (Langmuir 1993, 9, pages 3341 – 3344). Lewis et al. do not specifically teach the incorporation of C₆₀ buckyballs as a sensing platform. However, Lewis et al. do teach the incorporation of organic conductors, such as carbonaceous materials including carbon blacks, graphite, coke and C₆₀ materials (col. 4, lines 17 – 34). Lewis et al. teach that individual elements can be optimized for a particular application by varying their chemical make-up and morphologies (col. 6, lines 9 – 46). Lewis et al. teach that the conductive modified particles may comprise carbon products having attached at least one organic group (col. 4, lines 7 – 65). Li et al. do teach the incorporation of self-assembled Buckminsterfullerene C₆₀ multilayers (e.g., buckyballs) with a surface acoustic wave sensor (pages 3341 – 3342; figure 1). Li et al.

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teach that sensor selectivity depends on optimum chemical or physical interactions between the analyte and the sensing layer, such as mutual matching of polarity, size and structural properties (pages 3343 – 3344). Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the C₆₀ buckyballs having attached at least one organic group as a sensing platform, as taught by Li et al., with the sensing device, as taught by Lewis et al., in order to provide for an optimized sensing device.

Claims 6 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewis et al. in view of Ajayan (Chemical Review 1999, 99, pages 1787 – 1799). Lewis et al. do not specifically teach the incorporation of carbon nanotubes as a sensing platform. However, Lewis et al. do teach the incorporation of organic conductors, such as carbonaceous materials including carbon blacks, graphite, coke and C₆₀ materials (col. 4, lines 17 – 34). Lewis et al. teach that individual elements can be optimized for a particular application by varying their chemical make-up and morphologies (col. 6, lines 9 – 46). Lewis et al. teach that the conductive modified particles may comprise carbon products having attached at least one organic group (col. 4, lines 7 – 65). Ajayan presents a review of the current state of carbon nanotube technology. Ajayan does teach the use of carbon nanotubes in sensors. Ajayan teaches that nanotubes may be functionalized at their ends with various functional groups and used as probes in chemical or biochemical applications (page 1797). Ajayan also teaches that polymers may be physically doped (or filled) with nanotubes (page 1796). Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the carbon nanotubes having attached at least one organic group as a sensing platform, as taught

by Ajayama, with the sensing device, as taught by Lewis et al., in order to provide for an optimized sensing device.

Conclusion


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Manksy et al. teach sensor arrays for rapid materials characterization. Goodman et al. teach techniques and sensor array systems for analyte detection

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Sines whose telephone number is (703) 305-0401. The examiner can normally be reached on Monday - Friday (11:30 AM - 8 PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (703) 308-4037. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

BJS
January 12, 2003


Jill Warden
Supervisory Patent Examiner
Technology Center 1700